

ABSTRACT

Systems and methods of processing branch instructions provide for a bimodal predictor and a plurality of global predictors. The bimodal predictor is coupled to a prediction selector, where the bimodal predictor generates a bimodal prediction for branch instructions. The plurality of global predictors is coupled to the prediction selector, where each global predictor generates a corresponding global prediction for a branch instruction using different history or stew lengths. The prediction selector selects branch predictions from the bimodal prediction and the global predictions in order to arbitrate between predictors. The arbitration, update, and allocation schemes are designed to choose the most accurate predictor for each branch. Lower level predictors are used as filters to increase effective predictor capacity. Allocate and update schemes minimize aliasing between predictors. Branch predictors incorporating a plurality of global predictors in this fashion are more adaptive than conventional predictors with fixed branch history lengths and are able to achieve superior accuracy.